ABSTRACT OF THE INVENTION

A highly reliable industrial control system is produced using a network running a standard serial protocol. A safety protocol is embedded within the standard serial protocol by adding to special error detecting data redundant with the protocol of the standard serial network. In addition an overarching protocol involving timing of messages is imposed to provide the necessary level of reliability in the standard serial network. This approach allows the safety protocol to be used with a wide variety of commercially available serial communication standards without modification of the media or the specialized integrated circuits used for that communication. Safety protocol may be implemented in an additional level for integrated circuits or through firmware changes in programmable aspects of the industrial controller components.

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